SAMET ÜNSAL

Computer Engineering Student | Quantum Researcher
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PROFESSIONAL SUMMARY

Computer Engineering student with hands-on experience in systems programming, backend engineering, cybersecurity, and AI infrastructure. Developed cryptographic analysis tools, secure firmware update systems, and a Rust-based programming language and compiler for AI agents. Founder of HeptaCert, with experience designing software architectures, building scalable platforms, and delivering client-focused engineering solutions. Also involved in technical leadership and infrastructure initiatives at IEEE IKCU. Strong interests in compiler design, applied cryptography, post-quantum security, and low-level systems engineering.

CORE STRENGTHS

- **Systems & Compiler Engineering:** Rust, C, domain-specific language design, static type checking, compiler architecture, and execution runtimes.
- **Cybersecurity & Cryptography:** Secure Boot, Chain of Trust, cryptographic API analysis, Code Property Graphs (CPG), CBOM generation, and secure firmware updates.
- **Backend & Software Engineering:** Python, FastAPI, PostgreSQL, REST APIs, JWT/RBAC, software architecture, and system integration.
- **Infrastructure & DevOps:** Linux administration, Docker, CI/CD, reverse proxies, DNS management, and containerized deployments.
- **AI & Agent Systems:** AI agent orchestration, LLM integration, capability-based security, execution policies, and runtime development.
- **Engineering & Delivery:** Client requirement analysis, end-to-end software development, technical documentation, debugging, and cross-functional collaboration.

EXPERIENCE & LEADERSHIP

Forward-Deployed Engineer– Uslu Medya 2026 September – Present

Digital agency providing client-focused web development, software solutions, and digital transformation services.

- Collaborated directly with business clients to gather requirements, identify technical needs, and deliver tailored software solutions.
- Designed, developed, and deployed responsive websites and web-based applications based on client requirements.
- Managed end-to-end project delivery, from initial client meetings and solution planning to implementation and deployment.
- Customized and integrated CMS platforms, third-party services, and existing business systems to meet client needs.
- Provided ongoing technical support, troubleshooting, and improvements based on client feedback

Founder– HeptaCert 2025 January – Present

Technology initiative focused on software systems, infrastructure, and digital platforms

- Founded and managed a technology-focused initiative developing web, backend, infrastructure, and digital operations systems.
- Designed and maintained self-hosted Linux/Docker infrastructure for web, backend, mail, and internal services.
- Managed domain/DNS configuration, reverse proxy setup, containerized deployments, service monitoring, and troubleshooting.
- Led development of internal platforms including HeptaCert, event-management tools, backend services, and organizational systems.

Board Member – Heptapus Group 2025 January – Present

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Led development of internal platforms including HeptaCert, event-management tools, backend services, and organizational systems.

Quantum Security Engineer Intern – CyberQuanta 2026 March – 2026 September

Cybersecurity R&D focused on embedded systems, cryptographic security, secure boot, and firmware protection.
Platforms

- Researched and analyzed Secure Boot and Chain of Trust architectures across NXP i.MX, Silicon Labs EFR32, and STM32 platforms.
- Developed a C/CMake-based, cross-platform security abstraction prototype for firmware integrity verification, digital signatures, and secure update workflows.
- Implemented host-side security validation using OpenSSL, SHA-256, signed manifests, anti-rollback checks, and simulated A/B firmware updates.
- Evaluated hardware root-of-trust mechanisms, cryptographic key management, and vendor-specific firmware security architectures.
- Investigated secure firmware update requirements, SBOM integration, and embedded cybersecurity compliance considerations.

VOLUNTEER WORK

Founding Chair / Founder President – IEEE IKCU TechOps 2026 – Present

Technical Operations unit for IEEE IKCU activities and digital infrastructure

- Founded IEEE IKCU TechOps as a technical operations unit to centralize website, event technology, automation, and digital infrastructure work.
- Coordinated technical support for IEEE activities including event registration, QR/check-in workflows, certificate processes, mailing, and web operations.
- Defined operational workflows and documentation so technical requests could be handled consistently by the TechOps team.
- Supported the development and maintenance of digital tools used by IEEE IKCU Computer Society and related student activities.

Chairman / Team Leader – IEEE IKCU Computer Society 2025 – 2026

- Led student-led technical activities, event organization processes, and internal coordination within IEEE IKCU Computer Society.
- Designed, developed, and maintained the society's official website and supported digital communication needs.
- Coordinated technical, operational, and infrastructure-related needs for society activities.
- Official website: studentbranches.ieee.org/tr-ikcu

Software Team Leader – AHALTECH-eV's Solutions

- Led an 8-person software team working on autonomous vehicle navigation and decision-making systems.
- Contributed directly to decision-making algorithms, real-time sensor-processing modules, and integration workflows.
- Coordinated team communication, technical planning, debugging, task distribution, and software-module integration.

SELECTED PROJECTS

WorldPass – Quantum-Resistant Digital Identity Platform | github.com/mathissdupont/worldpass-real

- Designed backend architecture using FastAPI and PostgreSQL for a secure digital identity platform.
- Implemented JWT-based authentication, role-based access control, and modular REST API services.
- Containerized and managed backend services using Docker with attention to deployment and reliability.

HeptaCert – Certificate and Event Management Platform | cert.heptapusgroup.com

- Developed a certificate/event management concept with QR-based verification, participant workflows, and event operations support.
- Extended the system vision beyond certificates toward registration, check-in, event discovery, mailing, and analytics workflows.

Quantum Operating System (QOS) | github.com/mathissdupont/QOS

- Developed an experimental quantum-inspired operating-system concept focused on scheduling, coordination, and resource abstraction.
- Implemented prototype components in Python and explored mappings between quantum-inspired principles and system-level software.

Autonomous Vehicle Navigation System

- Designed and implemented decision-making algorithms for autonomous navigation workflows.
- Developed Python modules for real-time sensor-data processing, sensor-fusion support, and calibration strategies.

CryptoGraph – Cryptographic Code Analysis & Risk Assessment
github.com/mathissdupont/CryptoGraph

- Developed a multi-language cryptographic analysis tool using Code Property Graphs (CPG) and static analysis.
- Implemented cryptographic API detection, vulnerability assessment, and automated CBOM generation.

Secure Update Abstraction – Cross-Platform Embedded Security
github.com/mathissdupont/secure-update-abstraction

- Developed a hardware-independent secure firmware update framework in C for STM32, NXP, and Silicon Labs platforms.
- Implemented digital signature verification, anti-rollback protection, and A/B firmware update workflows.

Ingot – Programming Language for AI Agents
github.com/mathissdupont/ingot

- Designed and developed a domain-specific programming language and compiler for AI agent workflows using Rust.
- Implemented static type checking, capability-based security policies, execution budgets, and reproducible runtimes.

RESEARCH & PREPRINTS

The Quantum State Continuity Problem and Temporal Enforcement Against Fork Attacks
https://arxiv.org/abs/2601.00870

A Comparative Performance Evaluation of Kyber, sntrup761, and FrodoKEM for Post-Quantum Cryptography
https://arxiv.org/abs/2508.10023

TECHNICAL SKILLS

Programming Languages: Python, Rust, C, C++, Java, JavaScript, Dart

Backend & Databases: FastAPI, PostgreSQL, REST APIs, JWT Authentication, RBAC, API Design

Systems & Compiler Engineering: Compiler Design, Domain-Specific Languages (DSL), AST, CFG, DFG, Code Property Graphs (CPG), Static Analysis, CMake

Security & Cryptography: Secure Boot, Chain of Trust, OpenSSL, ECDSA, SHA-256, CBOM, Post-Quantum Cryptography, KEM Benchmarking

AI & Agent Systems: LLM Integration, AI Agent Runtimes, Model Context Protocol (MCP), Capability-Based Security, Policy Enforcement

DevOps & Infrastructure: Linux, Docker, Git, GitHub Actions, CI/CD, Reverse Proxies, DNS, Firewall Configuration, Containerized Deployments

EDUCATION

Bachelor's Degree in Computer Engineering 2022 – 2027
İzmir Kâtip Çelebi University | GPA: 3.20 / 4.00

LANGUAGES

Turkish: Native | English: Professional Working Proficiency | French: Beginner

CERTIFICATIONS

- Python Programming – Udemy
- Frontend Web Development – Microsoft
- Artificial Intelligence Summer Camp – Miuul
- Let's Transform with Artificial Intelligence